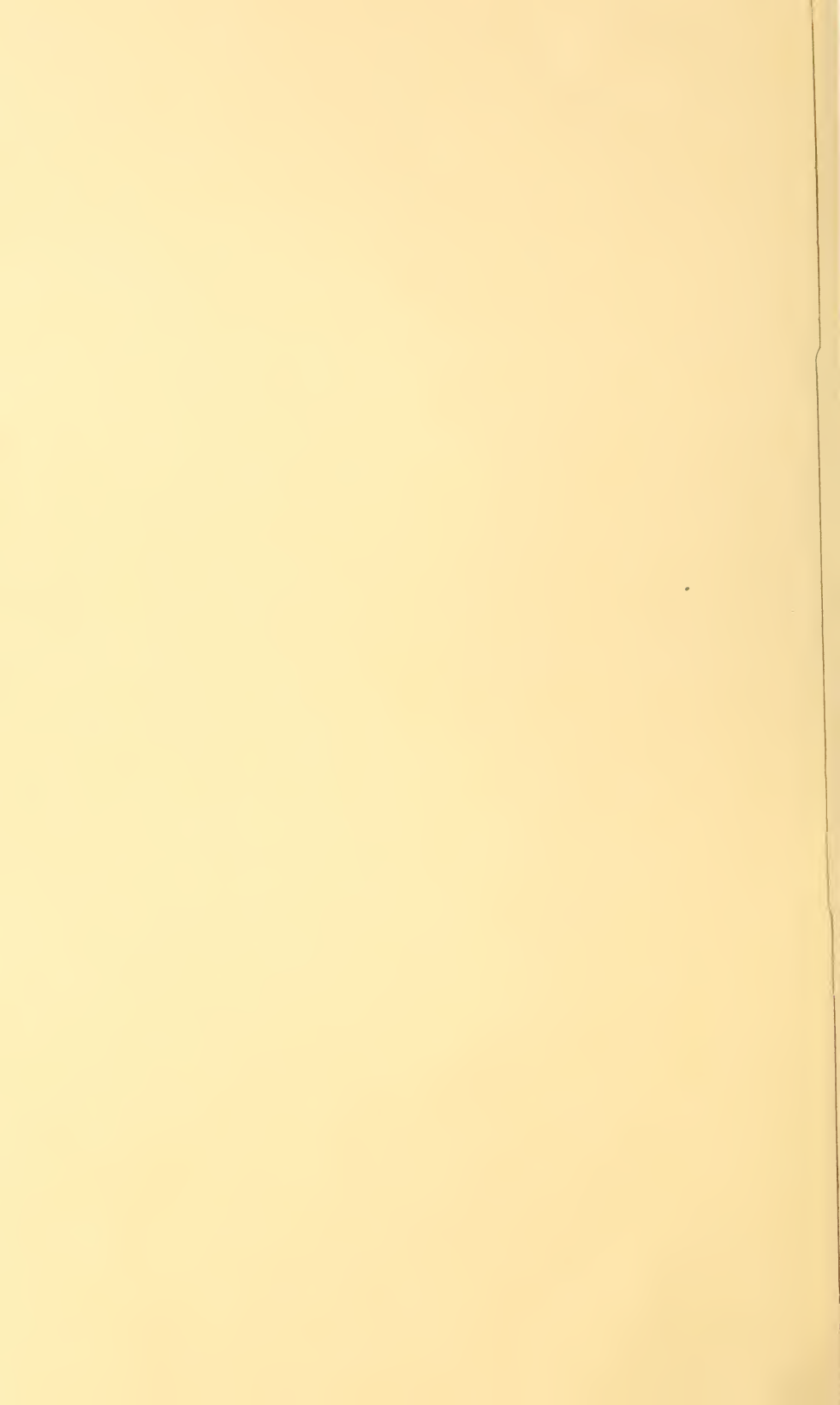


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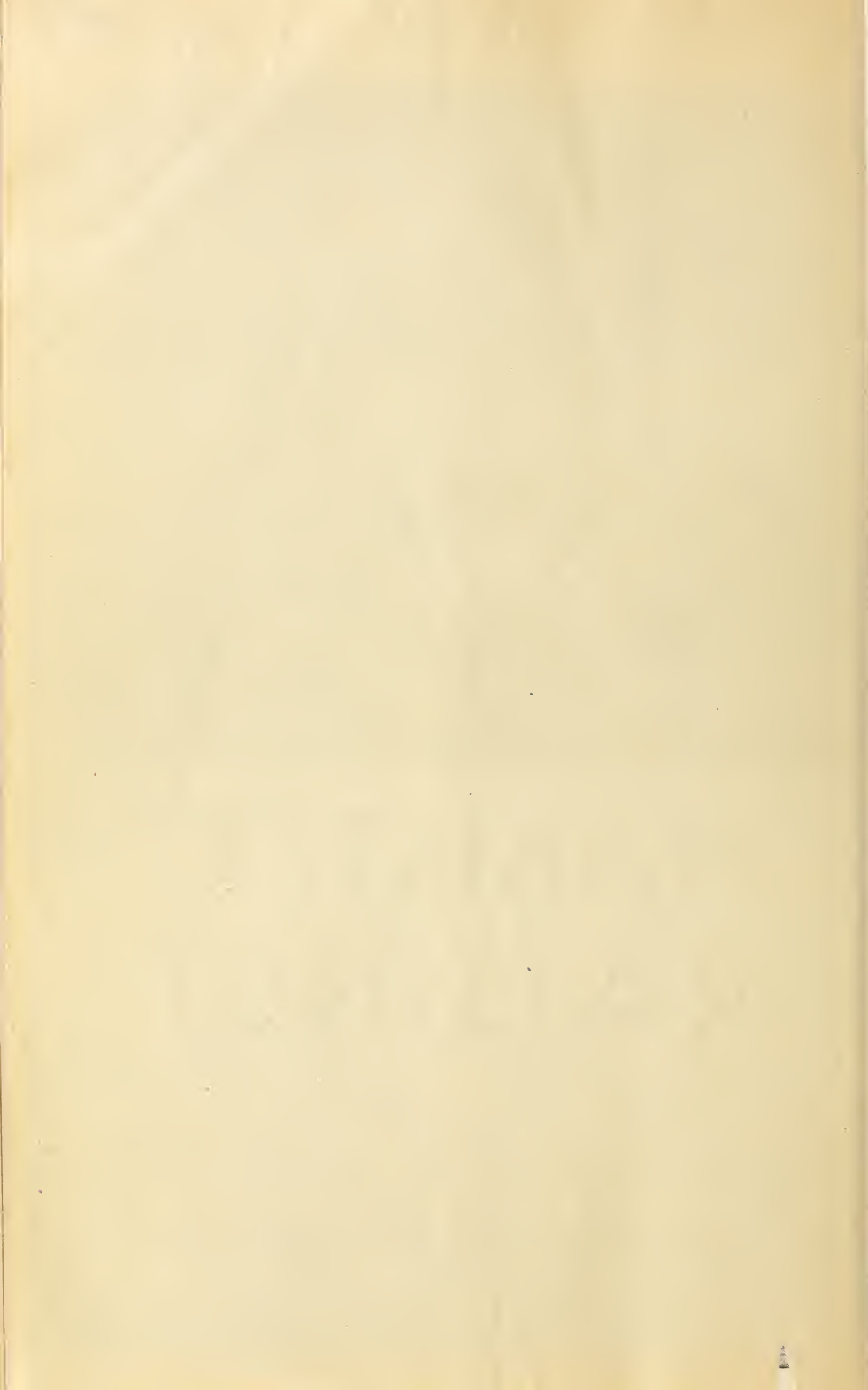
rev. 9/60



HAMSTER RAISING

LEAFLET NO. 250

U. S. DEPARTMENT OF AGRICULTURE



HAMSTER RAISING

By O. N. EATON, *animal husbandman, Animal Husbandry Division, Bureau of Animal Industry, Agricultural Research Administration*

The golden hamster has been gradually increasing in favor as a laboratory animal. It is smaller than the rat, rabbit, and guinea pig, and reproduces more rapidly. The hamster became popular in England for laboratory purposes before it was brought into the United States. Both the English and American laboratory stocks apparently descended from the same source, namely, a single litter taken in 1930 from a burrow in Aleppo, Syria, and maintained at Hebrew University in Jerusalem. Descendants of these animals were introduced into England in 1931 and into the United States in 1938.

DESCRIPTION

The golden hamster (*Cricetus auratus*) is a rodent belonging to the family Cricetidae. Members of this family are found in Europe, Asia, Africa, and America. It is reddish gold in color, with the ventral surface of the body nearly white, and with black markings on the head and cheeks. The eyes are black. The hamster has a short stubby tail and well-developed cheek pouches in which it transports grain and other food. The adult animal is about 6 inches long.

A larger form, the black hamster, is about 9 inches long and black except for the feet, tail, nose, upper lip, and margins of the ears, which are covered with white hair. Behind the ears and near the tail there is a reddish tinge. The black variety is found in Europe as far west as the Rhine River. It is more fierce than the Syrian hamster and has not been domesticated for laboratory use.

Hamsters in their native habitat burrow in the ground and make a main tunnel with numerous side chambers branching off, in which they store food.

USES

In general, hamsters may be used in the laboratory for the same purposes as rats, mice, or guinea pigs. However, since their reactions to many tests and their susceptibility to diseases are not as well known as those of other laboratory animals, many experimenters prefer to use standardized strains of other animal species. So far as is known,

Issued October 1948

no strains of hamsters have been specially developed for specific tests, as has been done with rats and mice. Much of the experimental work with hamsters at present is to determine their reactions in regular laboratory procedures.

The nutritional requirements of hamsters have been extensively determined. Since they are especially susceptible to the absence of vitamins D and K, without which they become severely hemorrhagic and die, hamsters are especially valuable in the assay of these vitamins. Hamsters are less valuable than guinea pigs in the assay of vitamin C. Calcium and phosphorus deficiency with no added vitamin D is manifested in hamsters by symptoms of experimental rickets as observed in the rat.

Although hamsters have not been used in disease investigations as extensively as other species of laboratory animals, they have been found useful in the diagnosis and investigation of a variety of infectious diseases. They have been found susceptible to the organisms causing equine encephalomyelitis and to those causing abortion in mares. Hamsters are more sensitive to leptospirosis than guinea pigs and are protected against the infection by rabbit-immune serum.

Little is known of the genetics of hamsters or of their response to close inbreeding such as has been employed in building up standardized strains of rats, mice, and guinea pigs. Theoretically it should be possible to develop such strains.

Hamsters are sometimes used as food in zoos for certain birds and animals which require live food.

Hamsters are popular also as pets and are useful in high school and college biology classes as an animal especially suitable for studies on reproduction because of their early maturity and short gestation period.

The main advantages of the golden hamster over other laboratory animals are in greater prolificacy, shorter gestation period, and smaller size in comparison with guinea pigs or rabbits. These factors contribute to economy of space, time, and cost of maintenance per animal. However, for some experiments the hamster cannot replace other species of laboratory animals.

Markets for hamsters are hospitals, laboratories, biological supply houses, and certain other institutions. It is not advisable to attempt to raise many hamsters for sale without first making arrangements for marketing the surplus animals.

Hamsters may not be imported from foreign countries into the United States without first obtaining, under certain rules and regulations, a permit from the Department of the Interior. Information concerning these permits may be obtained through the Fish and Wildlife Service, United States Department of the Interior, Washington 25, D. C.

MANAGEMENT

FEEDING

The natural food of the hamster consists of grains, seeds, and vegetables. A diet of corn, oats, or wheat mixed with some of the prepared dog or fox pellets proves satisfactory. In addition such vegetables as carrots, cabbage, or lettuce may be fed. Dry bread scraps also may be used. Water is essential at all times. Lack of it will cause the animals to lose weight and eventually die. However, when plenty of succulent greens are provided, the animals can get along with less water. This should be borne in mind when shipping hamsters. If the destination can be reached in 24 hours, enough succulent material can be placed in the shipping crate to satisfy the animals' water requirement for this period of time. If more than 24 hours are required for the animals to reach their destination, provision should be made with the shipping agents for watering the animals while in transit.

The vitamin requirements of hamsters have been extensively determined. Vitamins A, D, E, and K, and some of the B group are essential. Lack of vitamin E will result in death in 4 to 18 weeks. Most of the prepared dog biscuits are well balanced, containing the essential vitamins and minerals. Lactating females may be given 10 cubic centimeters (about 2 teaspoonfuls) of whole milk each per day. An adult hamster will require about 10 to 15 grams of food per day.

HOUSING AND EQUIPMENT

Hamsters should be kept in a building with a temperature between 55° and 70° F. Adult animals can stand temperatures considerably lower, but the new-born hamster will perish at lower temperatures. A drop of temperature to 45° F. causes the animals to go into a state of hibernation. They sleep, the body becomes rigid, and the body temperature falls below normal.

Hamsters should be kept in metal cages, or in wooden cages protected on the inside with hardware cloth to prevent their gnawing out. Cages may vary in size according to the number of animals to be kept together. A cage 12 by 15 inches and 12 inches high will comfortably house a pair. A cage 35 by 25 inches and 15 inches high will accommodate 8 to 10 animals. At least one side, or the door of the cage, should be of hardware cloth to admit light and provide a means of exercise by climbing. The floor of the cage may be of the self-cleaning type or it may be solid. In the self-cleaning type, the floor is of No. 6 hardware cloth to allow the droppings to fall through onto a sloping floor. Along the lower edge of this floor is a trough for catching the droppings and liquid excrement. The slope of the floor should be not less than 30° to allow the material to slide from it into the trough. If

the floor of the cage is solid, sawdust, wood shavings, ground corn cobs, peanut hulls, or other clean absorbent material should be used. Cleaning should be done regularly at least once a week to insure cleanliness necessary to the health of the animals. Frequent disinfection with any of the standard cresol disinfectants will lessen danger of disease and help keep down odors. Good ventilation, plenty of sunlight, plenty of absorbent material to take up liquid excrement, and regular and frequent cleaning all help to allay odors.

Water bottles should be provided with a $\frac{1}{4}$ -inch glass tube 4 to 5 inches long, the drinking end of which has been heated in a flame to smooth the sharp edges.

If light enters the cage from the front only, nest boxes may not be necessary for the young. However, if the cage is more open so that considerable light is admitted, it may be advantageous to have nest boxes. These should not be less than 6 inches square with an opening large enough to admit the pregnant female. The edges of the opening should be tinned. Excelsior, straw, hay, or shredded paper may be used for nesting material.

BREEDING AND GROWTH

The hamster will breed throughout the year, but the most litters are produced between November and May. A female rarely produces young after 1 year of age.

The mature female hamster weighs 105 to 135 grams and the mature male 95 to 120 grams.

Adult males and females not being used as breeders should be kept in separate cages. Several breeder females may be kept together in a cage with a male and removed as they show signs of pregnancy. Another practice is to introduce the male into a cage of females after 6:30 p. m. Mating takes place in the evening and is usually immediate if the female is in heat. The estrous cycle is 4 days.

The pregnant female should be placed alone in a cage about the thirteenth day of pregnancy as the other animals may devour the litter or cause the mother herself to devour it. The gestation period is 15 days 21 hours or approximately 16 days. The number of young per litter averages about 7, although as many as 12 or 13 may be born. The hamster has a shorter gestation period than the mouse or rat, permitting more litters per year. The hamster is more prolific than the guinea pig which has only 3 or 4 young per litter and a gestation period of 69 days. Young hamsters are born hairless, with the eyes closed, and weigh an average of 2 grams each. Growth is rapid, averaging a gain of 1 gram per day for the first 2 weeks. There is distinct pigmentation by the time the young are 72 hours old. Teeth are present at birth and they are able to eat solid food at 8 days,

prior to the opening of the eyes at 14 to 15 days. The vagina of the female opens when she is 8 to 14 days old, or when she weighs about 8 grams. Rupture of the vaginal membrane is more closely correlated with weight than with age. The young are left with the dam 18 to 21 days. Dams should be rested 4 to 6 days before remating.

Spermatogenesis begins in the male at about 35 days of age, but fertile matings have not been observed earlier than 43 days. First litters of females have been born at 59 days, but the average is 73 days.

The young males should be separated from the females at 35 days of age. The separating or "sexing" may be done at weaning time, but accuracy is more difficult at this age.

For observation hold the animal in the palm of the hand on its back. The penis of the male is about one-quarter to one-half inch from the anal opening. The vulva of the female is closer to the anus and is mostly bare except for a few grayish hairs. The general body contour also is an aid in distinguishing the sexes. From above, the male presents a tapered, elongated rear view, while the rear of the female is more blunt and not as brightly colored as that of the male.

In handling hamsters it is usually advisable to wear gloves, as they frequently bite severely. The animals are picked up with the thumb and index finger by the loose skin over the shoulders and neck. The larger animals may be supported by holding the lower portion of the body in the palm of the other hand. With frequent and gentle handling the animals become more familiar with the caretaker and are less likely to bite.

CAUSES OF DEATH IN HAMSTERS

In hamster raising, undue losses from disease are not customarily suffered if the animals are kept under proper conditions. However, they will contract certain diseases that may be brought into the colony by visitors, rats, mice, or insects, or by the introduction of new stock. The building which houses hamsters and the cages should be as nearly rat- and mouse-proof as possible. New stock should be isolated from the regular colony until it is known to be disease-free.

Screening and the use of sprays help in keeping down insect pests.

Cage paralysis is due to improper feeding, mainly lack of vitamin D, and to lack of sufficient exercise. Symptoms are inactivity of the animal, inability to raise the head, and the manner in which it crawls along, pushing its nose along the floor of the cage. Falls from the cage when the door is open or from the hand while being handled may result fatally.

Females may die giving birth, due to malformation of the pelvis. This is common with runty females. Only well developed vigorous animals should be used for breeders. Broken teeth resulting from falls or from biting the wires of the cage may cause inability to eat

and consequent starvation. Unbroken teeth may be clipped so that they will mesh evenly and enable the animal to eat.

Malocclusion frequently prevents the teeth from meeting properly and wearing down evenly. It may be necessary to clip the teeth occasionally. Animals with this deformity should not be used for breeders, as the condition often is inherited. Too much growth of the teeth may be due to a lack of hard food and something to gnaw.

Males, especially if from different litters, often fight fiercely and kill one another. A female with a litter will sometimes kill the male if he is left in the cage with her. Lack of water will cause death. Cannibalism may result from improper food balance, especially from a lack of minerals in the diet.

Undue disturbance of females with young may cause them to eat the litter. This disturbance may be from other females in the cage or from too much handling by the caretaker. It is good practice to remove the pregnant female about the thirteenth day to a separate cage fitted with a nest box. She should not be unduly disturbed for 2 or 3 days after the birth of her litter.

CAUTION

Breeders of hamsters are cautioned to prevent the escape of any of these animals. Such release under favorable conditions might establish the hamster in the wild and thereby create a serious rodent problem, since they are destructive to growing crops, gardens, and other agricultural enterprises. Purchasers should be aware of the danger of escapes, and make every effort to prevent the establishment of a wild colony.

